IN THE SPECIFICATION

1. Please amend the paragraph starting from line 19 on page 3 as follows.

As can be seen in Fig. 1, an apparatus is provided for etching a sample that includes a source chamber 11 containing a source of chemical etchant, maintained at a particular temperature and pressure for maintaining the etchant source in a solid or liquid state (e.g. solid state for XeF2 crystals, liquid state for BrF3, etc.). An expansion chamber 12 is in fluid communication with source chamber 11 and has any suitable size (e.g. a volumetric capacity of 29 cubic inches (0.46 liter)) to receive etchant gas from the source chamber 11, with a shutoff valve 13 joining these two chambers. An etch chamber 15 ~~14~~ is provided in fluid communication with expansion chamber 12 and has any suitable size (e.g. volumetric capacity of 12 cubic inches (0.18 liter)) to contain the sample microstructure to be etched. It is preferred that the etch chamber be smaller than the expansion chamber. The etch chamber 15 ~~14~~ is connected to the expansion chamber 12 via a shutoff valve 85 ~~15~~. Also included in the apparatus is a first gas source 19 ~~16~~ in fluid communication with the expansion chamber 12 via a further shutoff valve 21 ~~17~~, a second gas source 20 ~~18~~ in fluid communication with the expansion chamber through a separate shutoff valve 22 ~~19~~, a vacuum pump 23 ~~21~~ and associated shutoff valves 24 ~~22~~, 25 ~~23~~ to control the evacuation of the chambers.

2. Please amend the paragraph starting from line 1 on page 4 as follows.

Also shown in Fig. 1 are a third gas source 29 ~~24~~ serving as a pump ballast with an associated shutoff valve 30 ~~25~~ to prevent backstreaming from the pump 23 ~~21~~, and needle valves 32 ~~26~~, 33 ~~27~~, 31 ~~28~~ to set the gas flow rates through the various lines and to permit fine adjustments to the pressures in the chambers. Also shown, as will be discussed in more depth below, are gas analyzer 1 and valves 3 and 5 on opposite sides of the analyzer. The expansion chamber 12 and the etch chamber 15 ~~14~~ can both be maintained at a particular temperature, while different gases are placed in the first and second gas sources for the various etching processes. It should be noted that a single gas source could be used in place of gas sources 19 ~~16~~ and 20 ~~18~~.

3. Please amend the paragraph starting from line 9 on page 4 as follows.

The general procedure followed in these experiments began with the evacuation of both the expansion chamber 12 and the etch chamber 15 ~~14~~, followed by venting both chambers to atmospheric pressure with gas from the first gas source 19 ~~16~~ by opening the two shutoff

valves 21 ~~17~~, 85 ~~15~~, between this gas source and the two chambers. The sample was then placed in the etch chamber 15 ~~14~~ (with the shutoff valves 21 ~~7~~, 85 ~~15~~ open during the sample insertion) which was then sealed, and both the expansion chamber 12 and the etch chamber 15 ~~14~~ were evacuated. All valves were then closed.

4. Please amend the paragraph starting from line 15 on page 4 as follows.

The connecting valve 85 ~~15~~ between the expansion chamber 12 and the etch chamber 15 ~~14~~ was opened, and the shutoff valve 21 ~~17~~ at the outlet of the first gas source 19 ~~16~~ was opened briefly to allow the gas from the first gas source to enter the expansion and etch chambers. The shutoff valve 21 ~~17~~ is then closed. The connecting valve 85 ~~15~~ is then closed, and the expansion chamber 12 is evacuated and isolated. The supply valve 13 from the etchant source chamber 11 is then opened to allow etchant gas to enter the expansion chamber (due to the higher temperature of the expansion chamber). The supply valve 13 is then closed, outlet valve 25 ~~23~~ is opened, and the needle valve 33 ~~27~~ is opened slightly to lower the etchant pressure in the expansion. Both the outlet valve 25 ~~23~~ and the needle valve 33 ~~27~~ are then closed. The shutoff valve 22 ~~19~~ at the second gas source 20 ~~18~~ is then opened and with the assistance of the needle valve 32 ~~26~~, gas from the second gas source is bled into the expansion. At this point the expansion chamber 12 contains the etchant gas plus gas from the second gas source 20 ~~18~~, while the etch chamber 15 ~~14~~ contains gas from the first gas source.

5. Please amend the paragraph starting from line 27 on page 4 as follows.

With pump 23 ~~21~~ on, the connecting valve 85 ~~15~~ between the expansion chamber 12 and the etch chamber 15 ~~14~~ is then opened, and valves 3 and 5 are opened on both sides of gas analyzer 1, to allow the gas mixture from the expansion chamber to enter the etch chamber and flow through the etch chamber and gas analyzer, thereby beginning the etch process. As will be discussed further below, the etch process is continued until an end point is detected via the gas analyzer.

6. Please amend the paragraph starting from line 32 on page 4 as follows.

Many alternatives to the process scheme described above can be used. Additional gas sources and chambers, for example, can be utilized. For example, depending upon the diluent(s) used (gas sources 19 ~~16~~ and 20 ~~18~~), a plurality of diluent sources (N2, Ar, He, etc.) can be connected to the expansion chamber and/or to the recirculation loop for bleeding the

system after an etch. The air distribution system within the etching chamber can also be varied, for example by including U-shaped or cone-shaped baffles, or by using additional perforated plates and/or baffles.

7. Please amend the paragraph starting from line 25, page 10, as follows.

While the source chamber 11 can be a single chamber, the arrangement shown in FIG. 4 is an optional one in which the source chamber is actually a pair of chambers 11a and 11b arranged in series. The first of these chambers 11a contains the source material primarily in its condensed form, i.e., either as crystals to be sublimated or liquid to be vaporized. The second chamber 11b receives the source material gas evolved by sublimation from the crystals or by vaporization from the liquid in the first chamber 11a. To maintain these phases, the two chambers 11a and 11b will preferably be maintained at different temperatures (preferably at least 5 degrees C difference), the former 11a at the lower temperature to keep the material in its condensed form (solid crystals or liquid) and the latter 11b at the higher temperature (and possibly a higher pressure as well) to keep the material in the vapor form (and to avoid the problem of condensation) at a pressure sufficiently high to allow it to be supplied to the succeeding chambers at the pressures needed in those chambers. In one embodiment, the two chambers are held at temperatures above room temperature, with chamber 11b held at a temperature from 2 to 24 degrees C (preferably around 5 to 10 degrees C) higher than the temperature of chamber 11a. Such a two-chamber embodiment could likewise be utilized in a system such as that illustrated in Fig. 1. Chambers 11a and 11b could also be arranged in parallel. Also shown in Fig. 4 are the expansion chamber 12, the etching chamber 15, and pumps 18 and 88 ~~23~~.

IN THE DRAWINGS

Please replace pages 1 of 9 (1/9) and 4 of 9 (4/9) with the respective new drawings. The new drawing corrected the errors of the reference numerals in the replaced drawings.